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Nonfatal Physical Violence, United States, 1994

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S Y N O P S I S

Objectives. Most surveillance and research efforts focus on severe violence, especially on homicides. Because less extreme forms of violence may be precursors to more extreme forms, the authors analyzed data from a national survey to describe the extent of nonfatal physical violence in the US.

Methods. The authors generated weighted national estimates from responses to a random-digit-dialed telephone survey. Respondents were asked if they had been "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" in the preceding 12 months. Respondents were also asked how many times such incidents had occurred and, for the last such episode, their relationship with the perpetrator, whether they had been injured, and, if so, whether they had sought medical treatment.

Results. The authors estimate that approximately 15 million people, or 8% of the US adult population, experienced nonfatal physical violence, as defined for this study, during a 12-month period. Male gender, the 18–24-year-old age group, never having been married, being out of work or a student, and heavy drinking were associated with a higher likelihood of being assaulted. An estimated 75% of assaults were by a known person and 26% by a stranger. Women were more likely than men to be assaulted by current or former intimate partners; men were more likely than women to be assaulted by strangers. An estimated 18% of incidents resulted in injuries, and an estimated 7% required medical attention.

Conclusions. Nonfatal physical violence is fairly common in the US and may lead to more than one million medical encounters each year.

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Physical violence between individuals occurs on a continuum of behavior ranging from minor physical violence (pushing or slapping) to homicide, and may be defined as beginning and ending anywhere along that spectrum. Most surveillance and research efforts have focused on the extreme end of the violence spectrum, especially on homicides.

While violence is generally seen as a significant social and public health problem, the magnitude and characteristics of the problem are not thoroughly understood. There is some evidence that events of minor physical violence are a precursor to more extreme health and injury outcomes.¹ Intervention early in the development of violent behavior might prevent more extreme outcomes. Accordingly, we were interested in learning more about the experience of nonfatal physical violence. Using data from a large, national injury control survey, we analyzed reports of being "hit, slapped, pushed or kicked by another person or hit with an object or weapon" in the 12 months prior to the interview.

The Injury Control and Risk Survey (ICARIS). The data used for the present study are from the Injury Control and Risk Survey (ICARIS), a random-digit-dialed telephone survey conducted in 1994.²⁻¹³

ICARIS survey staff drew a stratified random sample from a proprietary list of telephone exchanges that links Census data with telephone exchanges in all 50 states and the District of Columbia. Because studies have shown that there are ethnic differences in injury rates,¹⁴ the survey oversampled telephone exchanges with 10% or more of households occupied by members of minority ethnic groups to improve the precision of minority group-specific estimates. Calls were made by trained interviewers from April 28, 1994, through September 18, 1994. At least six attempts were made to contact each number. Interviews were conducted in English or Spanish, as appropriate.

Because injury rates differ by sex,¹⁵ ICARIS was designed to achieve an equal sex balance of respondents to improve the precision of sex-specific estimates. Once a household was reached, the interviewer asked the numbers of adult men and women in the household ages 18 years and older. One gender was randomly selected for each household using a specified random selection procedure. If there were more than one eligible person of the selected gender, the person with the most recent birthday was selected for the interview. Additional calls were made if necessary to reach that

person. After giving consent for the interview, the adult respondent was questioned about personal and household characteristics and a variety of injury-related subjects, including fire safety behavior, seat belt use, and drinking and driving.

Estimating nonfatal physical assaults. One of the questions included in the ICARIS interview protocol was: "During the past 12 months, that is since [date], have you been hit, slapped, pushed or kicked by another person or hit by them with an object or weapon?" When the answer to this question was "yes," respondents were asked how many times this had occurred in the previous 12 months. For the most recent event, respondents were asked about their relationship to the perpetrator, whether they were injured, and, if injured, whether they had sought medical treatment for the injury.

ICARIS had a response rate of 56.1%, with a total of 5238 completed interviews, 3630 refusals, and 474 incomplete interviews. Thirteen respondents did not answer the question about being hit, pushed, or kicked.

We defined being "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" as a physical assault.

Of the 420 respondents who said reported having been hit, pushed, or kicked, 17 could not or were unable to specify how many such incidents they had experienced in the preceding 12 months (coded as "don't know"), and five refused to answer the frequency question. Five did not specify their relationship to the perpetrator, and 24 refused to answer the relationship question. Two did not specify whether they had been injured, and one respondent refused to answer the injury question.

Positive responses included instances of legitimate or sanctioned uses of violence (for example, in play). One respondent with a number of episodes was a karate instructor. Also included were work-related assaults; for example, one respondent was a bouncer, another a prison guard.

METHODS

Because the ICARIS sampling strategy involved oversampling members of minority groups and equalizing the sex balance, the data required weighting to be representative of the US population. Each respondent was assigned a weighting factor, which was equal to the inverse of the selection probability weight multiplied by the post-stratification weight. The selection probability

Characteristics associated with greater frequencies of reports of physical violence included male sex, younger age, never having been married or being separated or divorced, being out of work or a student, and consuming alcoholic beverages.

weight was the probability of selecting a particular household and respondent. The post-stratification weight was a ratio adjustment that scaled up individual records to fully represent similar age-sex-race group individuals in the same Census region and Metropolitan Statistical Area. Full details are provided elsewhere.²

For each analysis, we summed individual weighting factors to obtain a weighted US number, and then calculated a weighted US percentage by dividing the weighted estimate by the appropriate population denominator using 1994 intercensal estimates.¹⁶

We used survey data analysis software developed to account for the complex survey design to generate weighted US estimates (numbers and percents) and appropriate 95% confidence intervals.¹⁷ We did not generate national estimates when the coefficient of variation was >30 .

We used the characteristics of the 420 people who reported having been "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" at least once in the 12 months prior to the interview to generate weighted estimates.

We used the log-likelihood chi-square test to assess the association between the likelihood of being "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" and non-ordinal variables (sex, marital status, employment status, Census region). *P* values of <0.05 were considered statistically significant. For ordinal variables (age, educational level, alcohol consumption), we used a chi-square test for trend.

Consumption of alcoholic beverages was stratified into four categories: heavy = every day or nearly every day in past month; moderate = 1–4 days per week in past month; light = 1–3 times during past month; non-drinker = no alcoholic beverages consumed in past 30 days.

Using responses to questions about the most recent event, we looked at the associations between characteristics of the respondents and: relationship with the perpetrator; injuries; and need for medical attention.

RESULTS

Of 5238 ICARIS respondents, 420 reported having been "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" in the 12 months prior to being interviewed. The weighted values for individual respondents summed to a total of more than 15 million people experiencing nonfatal physical violence in 1994. Using as a denominator the US adult population ages 18 and older from 1994 intercensal estimates,¹⁶ we calculated that this weighted total represented 8.0% of the 1994 US adult population.

The bivariate analysis showed no differences in the weighted percentages of people who reported being hit, pushed, or kicked by educational level or Census region (Table 1). Characteristics associated with greater frequencies of reports of physical violence included male sex, younger age, never having been married or being separated or divorced, being out of work or a student, and consuming alcoholic beverages (Table 1). These variables remained significant predictors in multivariable modeling (not shown), except never having been married and student status.

Multiple incidents. Of those who reported having been hit, pushed, or kicked, 231 of 420 reported more than one such incident in the preceding 12 months, which extrapolates to about 5% of the US adult population. Multiplying each individual's weighting factor by the number of incidents reported by that individual, we estimated that there were 72.6 million such incidents of

Table 1. Self-reports of having been "hit, slapped, pushed or kicked by another person or hit by them with an object or weapon" within 12 months prior to interview, by demographic characteristics, ICARIS, 1994*"Hit, slapped, pushed or kicked by another person or hit by them with an object or weapon" within 12 months prior to interview*

Self-reported characteristic	Number	Number	Weighted	
			Percent	95% CI
Sex^a				
Male	2683	258	10.3	8.8, 11.8
Female	2555	162	5.8	4.7, 6.9
Total	5238			
Age (years)^b				
18-24	599	140	25.6	21.0, 30.2
25-34	1308	153	11.9	9.7, 14.1
≥ 35	3263	123	2.9	2.3, 3.6
Total	5170			
Marital status^a				
Never married	1201	183	17.7	14.6, 20.8
Separated or divorced	825	101	13.6	10.6, 16.8
Widowed	433	6	— ^c	
Married	2729	126	4.3	3.5, 5.2
Total	5188			
Educational level				
Less than high school	696	49	7.0	4.7, 9.4
High school graduate	1487	137	9.0	7.1, 10.8
More than high school	3022	233	7.7	6.5, 8.9
Total	5205			
Employment status^a				
Out of work	275	38	15.2	9.9, 20.4
Homemaker/public assistance/retired	1232	35	2.1	1.2, 3.0
Student	211	38	19.8	12.7, 26.8
Employed	3471	306	9.1	7.8, 10.3
Total	5189			
Consumption of alcoholic beverages^b				
Heavy	236	30	16.3	8.8, 23.8
Moderate	1055	110	10.5	8.2, 12.8
Light	1490	148	9.9	8.0, 11.8
Nondrinker	2415	129	5.0	3.9, 6.0
Total	5196			
Census region				
Northeast	839	71	6.9	4.9, 8.9
North Central	1069	91	9.4	7.2, 11.5
South	2181	153	6.9	5.5, 8.2
West	1149	105	9.3	6.9, 11.6
Total	5238			
Total	5238	420	8.0	7.0, 8.9

^aAssociation between characteristic and being "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" in the preceding 12 months significant at the $P < 0.05$ level, log likelihood chi-square test

^bAssociation between characteristic and being "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" in the preceding 12 months significant at the $P < 0.05$ level, chi-square test for trend

^cInsufficient number to calculate stable national estimate; coefficient of variation $> 30\%$

ICARIS = Injury Control and Risk Survey

CI = confidence interval

“We estimated that there were 72.6 million...incidents of nonfatal physical violence, or approximately 38 per 100 adults, in 1994.”

nonfatal physical violence, or approximately 38 per 100 adults, in 1994. The weighted totals showed that those who experienced more than one incident in the 12 months prior to the interview were more likely than those who experienced only one incident to know the perpetrator of the most recent incident. Those who experienced only one incident were more likely to report the perpetrator as a stranger.

Relationship with perpetrator. Using the respondents' description of the most recent incident, we summed individual weights, by relationship with perpetrator, and divided these sums by the appropriate population denominators to obtain weighted US percentages. (See Table 2.) We calculated that the perpetrator was a known person in 74.5% of incidents, a friend or acquaintance in 34.7%, a current or former intimate partner in 26.0%, and a family member or relative in 13.8%. An estimated 25.5% of incidents involved strangers as perpetrators.

Multiplying individual weights by the number of events reported by each individual and summing these by relationship with the perpetrator, we calculated that of the 72.6 million estimated physical assaults in 1994, 23.2 million were by friends or acquaintances, 22.4 million by current or former intimate partners, 6.3 million by relatives, and 14.6 million by strangers.

For the most recent incident, the relationships with the perpetrators varied significantly by sex and by the marital status of the victim (Table 2). Women were more likely than men to report having been hit, pushed, or kicked by current or former intimate partners, while men were more likely than women to report being hit, pushed, or kicked by strangers. We estimated that in 1994, a current or former intimate partner was the perpetrator in 16.4% of incidents among all never-married

victims and in 37.2% of incidents among married victims. We did not find an association between relationship to the perpetrator and age, educational level, employment status, drinking behavior, or Census region.

We found a significant association between relationship with perpetrator and reporting multiple vs single incidents ($P < 0.001$). Using the most recent incident as a reference, we summed the individual weights for those who reported more than one incident, by relationship with perpetrator, and divided these sums by the appropriate population denominators to obtain weighted US percentages. We then repeated this process for those who reported a single incident. We estimated that for people who were assaulted more than once in 1994, the perpetrator in 35.4% of incidents was a friend/acquaintance, followed by a current/former intimate partner (34.8%), other relative (15.4%), and stranger (14.4%). In contrast, for those experiencing only a single incident, the perpetrator was a stranger in an estimated 42.1% of incidents, followed by friend/acquaintance (33.5%), intimate/former partner (12.9%), and other relative (11.4%).

Injuries and medical attention. Of 420 ICARIS respondents who reported having been “hit, slapped, pushed, or kicked by another person or hit with an object or weapon” in the 12 months before the interview, 86 reported having been injured in the most recent incident and 33 reported seeking medical attention as a result of the most recent incident (Table 3). Using individual weighting factors and referring only to the most recent incident, we estimated that approximately 18.2% of incidents in 1994 resulted in injuries, and that medical attention was sought in an estimated 7% of incidents. The weighted estimates showed that

Table 2. Self-reported relationship with perpetrator, by demographic characteristics of adults reporting having been "hit, slapped, pushed or kicked by another person or hit by them with an object or weapon" within 12 months prior to interview, ICARIS, 1994

Self-reported characteristic	Current/former intimate partner			Other family/relative			Friend/acquaintance			Stranger		
	Number	Weighted		Number	Weighted		Number	Weighted		Number	Weighted	
		Percent	95% CI		Percent	95% CI		Percent	95% CI		Percent	95% CI
Sex												
Male	258	17.5	12.1, 22.8	24	11.3	6.3, 16.2	86	38.4	30.5, 46.4	84	32.9	25.3, 40.5
Female	162	40.4	30.1, 50.7	28	18.0	10.1, 26.0	49	28.4	19.8, 37.0	18	13.2	5.8, 20.5
Total	420											
Age (years)												
18-24	140	19.6	11.0, 28.2	25	16.2	9.0, 23.3	44	36.2	25.5, 46.8	37	28.1	18.0, 38.1
25-34	153	30.1	20.7, 39.4	11	— ^b	— ^b	50	32.8	23.6, 42.0	40	27.6	18.7, 36.5
≥ 35	123	30.4	20.2, 40.6	16	15.8	6.7, 24.9	40	35.4	24.8, 46.1	24	18.4	9.8, 26.9
Total	416											
Marital status^a												
Never married	183	16.4	9.5, 23.4	23	14.8	7.8, 21.8	70	41.9	32.1, 51.6	50	26.9	18.1, 35.8
Separated or divorced	101	31.8	20.2, 43.4	8	— ^b	— ^b	27	25.6	15.1, 36.2	24	29.9	17.1, 42.7
Married	126	37.2	26.8, 47.7	18	12.2	6.2, 18.2	35	29.0	19.8, 38.3	27	21.5	13.2, 29.9
Total	410											
Educational level												
Less than high school	49	35.3	18.1, 52.6	7	— ^b	— ^b	10	— ^b	— ^b	15	27.5	11.6, 43.4
High school graduate	137	28.5	18.5, 38.5	19	13.3	6.1, 20.4	39	35.4	24.0, 46.7	28	22.9	13.4, 32.3
More than high school	233	22.6	15.7, 29.4	26	13.0	7.3, 18.8	86	37.8	29.7, 45.8	59	26.7	19.0, 34.4
Total	419											
Employment status												
Out of work	38	28.5	11.9, 45.1	6	— ^b	— ^b	10	30.4	12.6, 48.2	7	— ^b	— ^b
Homemaker/public assistance/retired	35	37.2	14.7, 59.7	6	— ^b	— ^b	9	— ^b	— ^b	6	— ^b	— ^b
Student	38	— ^b	— ^b	6	— ^b	— ^b	11	33.8	14.5, 53.1	12	— ^b	— ^b
Employed	306	23.8	17.6, 30.1	34	11.8	7.4, 16.3	105	36.6	29.4, 43.9	77	27.7	20.8, 34.6
Total	417											
Consumption of alcoholic beverages												
Heavy	30	— ^b	— ^b	3	— ^b	— ^b	9	— ^b	— ^b	10	— ^b	— ^b
Moderate	110	22.6	12.9, 32.3	12	— ^b	— ^b	30	27.7	17.2, 38.1	33	36.0	24.2, 47.9
Light	148	27.5	18.2, 36.8	18	13.7	6.6, 20.8	50	35.6	26.0, 45.1	33	23.2	14.1, 32.4
Non drinker	129	30.1	19.5, 40.8	19	17.3	8.3, 26.2	44	34.8	24.2, 45.3	25	17.8	9.5, 26.2
Total	417											
Census region												
Northeast	71	35.9	20.5, 51.3	11	— ^b	— ^b	14	20.5	8.6, 32.4	16	28.8	13.7, 43.9
North Central	91	23.0	12.6, 33.3	11	— ^b	— ^b	37	42.4	30.3, 54.5	17	21.4	10.9, 31.8
South	153	26.1	17.0, 35.2	20	15.9	8.4, 23.3	56	36.1	26.8, 45.5	32	21.9	13.1, 30.7
West	105	22.6	12.6, 32.5	10	— ^b	— ^b	28	33.8	19.6, 47.9	37	32.7	20.3, 45.1
Total	420											
Total sample	420	26.0	20.6, 31.5	52	13.8	9.5, 18.1	135	34.7	28.6, 40.7	102	25.5	19.9, 31.1

^aAssociation between characteristic and perpetrator category significant at the P < 0.05 level, log likelihood chi-square test

^bInsufficient sample to calculate stable national estimate; coefficient of variation > 30%.

ICARIS = Injury Control and Risk Survey

CI = confidence interval

Reports of being hit, pushed, or kicked were more common among males than females, more common among younger than older people, and more common among drinkers than among nondrinkers.

women reporting physical assaults were significantly more likely to report injuries than men.

For the most recent event, an estimated 600,000 people were injured by current or former intimate partners, but the coefficient of variation was too high (44%) to estimate what percentage sought medical attention.

Based on the characteristics of the most recent event, we estimated that medical attention was sought for 11% of injuries due to stranger-perpetrated physical assaults.

Using individual weights and the number of times each respondent reported having been assaulted and applying the characteristics of perpetrator and the injury outcome of the last episode to all episodes, we estimated that there were 17.4 million physical assault-related injuries in the US in 1994: in 5.1 million the perpetrator was a current or former intimate partner, in 4 million a friend or acquaintance, in 900,000 another relative, and in 7.1 million a stranger. Medical attention was sought for an estimated 9.8 million injuries: 2.5 million inflicted by a current or former intimate partner, 1.4 million by a friend or acquaintance, 500,000 by another relative, and 5.3 million by a stranger.

DISCUSSION

Physical violence is common in the United States; an estimated 8% of the US adult population are "hit, slapped, pushed, or kicked by another person or hit with an object or weapon" at least once annually. Reports of being hit, pushed, or kicked were more common among

males than females, more common among younger than older people, more common among those not currently married (never married, separated, or divorced) than among married people, more common among students and the unemployed than among people who were employed, homemakers, and retired, and more common among drinkers than among nondrinkers. According to weighted estimates, more than half of those who reported such incidents had experienced more than one incident in the preceding 12 months.

Typically, the perpetrator was known to the respondent: according to the weighted estimates, almost 35% were hit, pushed, or kicked by a friend/acquaintance, 26% by a current/former intimate partner, and almost 14% by a family member/relative. On the other hand, the perpetrator was a stranger in approximately a quarter of all incidents. Males were most likely to be hit, pushed, or kicked by a friend or acquaintance, while females were most likely to be hit, pushed, or kicked by a current or former intimate partner.

Our findings mirror those of studies of other kinds of violence. For example, homicides are more common among males than among females and more common among younger adults than among older people.¹⁸

Because our definition of assault includes both criminal and legitimate or sanctioned uses of violence, our estimates are substantially higher than the numbers of violent crimes reported from the National Crime Victimization Survey. Data from the NCVS show that there were approx. 9.1 million violent crimes in the US in 1996,¹⁹ while we estimated 72.6 million episodes of physical violence for 1994 using a much broader definition.

Table 3. Self-reported injuries associated with having been “hit, slapped, pushed or kicked by another person or hit by them with an object or weapon” within 12 months prior to interview, by demographic characteristics, ICARIS, 1994

Self-reported characteristic	Number	Injured			Sought medical attention		
		Number	Percent	95% CI	Number	Percent	95% CI
Sex							
Male	258	41 ^a	14.2	9.0, 19.3	15	4.6 ^a	1.9, 7.4
Female	162	45	24.9	16.6, 33.1	18	11.2	4.9, 17.5
Total	420						
Age (years)							
18–24	140	30	16.8	9.8, 23.8	9	— ^b	
25–34	153	31	18.7	11.1, 26.3	13	— ^b	
≥ 35	123	25	20.5	11.2, 29.9	11	— ^b	
Total	416						
Marital status							
Never married	183	38	17.4	10.6, 24.3	14	— ^b	
Separated or divorced	101	29	28.6	17.6, 39.6	13	16.8	7.0, 26.6
Widowed	6	1	— ^b		1	— ^b	
Married	126	16	13.3	6.3, 20.3	5	— ^b	
Total	416						
Educational level							
Less than high school	49	14	28.3	11.8, 44.8	4	— ^b	
High school graduate	137	34	21.1	13.2, 29.0	11	— ^b	
More than high school	233	37	14.0	8.6, 19.5	18	— ^b	
Total	419						
Employment status							
Out of work	38	13 ^a	31.7	14.6, 48.9	4	— ^b	
Homemaker/public assistance/retired	35	11	— ^b		7	— ^b	
Student	38	12	34.1	14.8, 53.3	2	— ^b	
Employed	306	50	13.2	8.9, 17.4	20	5.4	2.7, 8.0
Total	417						
Consumption of alcoholic beverages							
Heavy	30	7	— ^b		2	— ^b	
Moderate	110	23	22.5	12.9, 32.0	8	— ^b	
Light	148	24	11.3	6.1, 16.6	10	— ^b	
Nondrinker	129	31	24.6	14.7, 34.4	13	— ^b	
Total	417						
Census region							
Northeast	71	20	20.4	10.1, 30.7	8	— ^b	
North Central	91	19	20.4	10.7, 30.1	8	— ^b	
South	153	31	19.9	12.1, 27.6	9	— ^b	
West	105	16	— ^b		8	— ^b	
Total	420						
Total sample	420	86	18.2	13.7, 22.7	33	7.1	4.2, 10.1

^aAssociation between characteristic and outcome category significant at the P <0.05 level, log likelihood chi-square test

^bInsufficient sample to calculate stable national estimate; coefficient of variation >30%.

ICARIS = Injury Control and Risk Survey

CI = confidence interval

Injuries. Our estimate of 9.8 million injuries annually due to physical assaults is probably a substantial overestimate and is presented as an upper range. Our estimate was based on self-reports of the most recent event; previous events may have had either more severe or less severe outcomes. However, because it is likely that respondents preferentially recalled the most memorable or dramatic episode, our estimate is more likely to be an overestimate than an underestimate.

The true number of annual assault-related injuries, while probably lower than 9.8 million, is certainly higher than the 1 million visits we estimated using the most recent event only and probably higher than the two million emergency department visits for assault-related injuries reported in the National Hospital Ambulatory Medical Care Survey.²⁰ Many assault-related injuries seen in emergency departments will be for penetrating wounds (gunshots and stabbings) that would probably not have been reported in our survey. Additionally, many people who have been physically assaulted do not sustain injuries severe enough to warrant a visit to the emergency department.

Limitations. Our findings should be considered in the light of several limitations. First, the survey response rate for ICARIS was lower than desirable. However, the sample appeared representative of the US population when compared across a number of demographic characteristics.⁵ Nevertheless, some selection bias may have existed, and we do not know how survey participants differed from nonparticipants for the violence outcomes under study. Most survey refusals (65.6%) occurred within the first few seconds of telephone contact, before mention of any specific survey subject. The refusal rate for the questions about being hit, pushed, or kicked was relatively low (0.2%).

Second, our findings are limited by sample size. We had too few respondents to perform multivariable analyses of their characteristics, especially with respect to the perpetrator and repeat episodes of victimization.

Third, there are a number of measurement issues that should be considered in the interpretation of findings.²¹ Remembering an event as being more recent than it actually was ("telescoping") is a potential problem inflating the estimates.²² In addition, injury status and perpetrator of the violence were reported only for the last episode; as noted above, respondents with more than one episode may have preferentially recalled the most memorable episode

(for example, one in which they were injured) as the most recent one.

Conversely, we may have underestimated the true numbers. Some respondents may have failed to report events that were upsetting or traumatic and some may have omitted or downplayed events that they found embarrassing. For example, some interviewers anecdotally reported that when asking questions about victimization, some respondents lowered voices in what was perceived to be an attempt to avoid being overheard.

Implications. It is important to better understand the causes of the various forms of violence in order to develop interventions that break the causal chain and to implement and evaluate these interventions for efficacy and cost-effectiveness. The limitations of the present study—the possibility of over- or underestimation and the difficulty of comparing our estimates to those from other studies—highlight the need to develop standard and consistent definitions and to identify common variables that can be used across studies and surveillance systems.

The escalation of violent behavior is often an interactive and complex process. The numbers reported here provide a window into this process, but unfortunately we have no data about the circumstances of each incident (for example, whether the perpetrator was reacting to being hit, pushed, or kicked first). Injury outcomes of violence frequently include all parties involved in the conflict, and roles in violence are not always as simple as delineating a victim and a perpetrator. One way to refine the definition in future efforts might be to ask specific questions about the intent of the perpetrator and about the circumstances of the assault.

Violence-related injuries are often preventable.^{18,23,24} Ideally, prevention programs need to identify and intervene with those at risk for perpetrating or experiencing violence. Although women were only half as likely as men to report having been assaulted, among those who experienced assaults, women were more likely to be injured than men. As reported in other studies,²⁵ many of women's injuries stemmed from intimate partners. Thus, prevention strategies should continue to focus on intimate partner violence and target behaviors in men that lead to violence in intimate relationships. Men, younger people, and heavier drinkers appear to be at particular risk for stranger-perpetrated physical violence, and stranger-

perpetrated physical violence is apparently more likely to result in injury than violence perpetrated by known individuals. These findings are consistent with those of other studies suggesting that young men who drink heavily are at high risk of being injured when hit, pushed, or kicked by a stranger.²⁶ Given that young men who drink heavily are at risk for a number of negative health outcomes, this population could be targeted for prevention programs that address not only sensible alcohol use but also conflict resolution skills and other violence prevention strategies.

Overall, our estimates argue for far more emphasis on primary prevention programs and finding solutions to the problem of violence. As a society, we need to better

understand the causes of the various forms of violence, to develop interventions consistent with breaking the causal chain, and to implement and evaluate these interventions for efficacy and cost-effectiveness.

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